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ABSTRACT

Student and teacher materials are provided for a secondary unit on world hunger. The student materials are contained in a module entitled "Food and Population: A Global Concern," distributed with the newsletter "Interchange." The teacher materials are contained in the issue of the newsletter itself, subtitled "The Paradoxes of World Hunger." A reading for students deals with the following aspects of the relationship between the world food supply and population growth: how the human population became so large, the extent and location of world hunger, recent agricultural advances, the role of poverty and population growth, biological constraints on food production, the question of food aid versus development aid, and strategies for addressing world hunger problems. Ten charts and graphs illustrate population trends, population growth, vital statistics, world calorie consumption, and agricultural and food production statistics. The reading also includes a description of a new study of the United Nations Food and Agriculture Organization. A 2-page resource section concludes the student materials. The accompanying teacher's guide introduces the main themes covered in the student reading and provides a variety of classroom activities to accompany student materials. Activities include an 18-item student check-up which may be used for pre- and posttests, class discussion, or evaluation; an exercise for interpreting tables within the student reading; suggestions for brainstorming and small group problem solving; a cartoon interpretation activity; a creative writing assignment; and a variety of topics for student research and debate. A 7-item teacher resource list is provided. (LP)

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FOOD AND POPULATION: A GLOBAL CONCERN

WORLD BANK PHOTO by Ray Witlin

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FOOD AND POPULATION: A GLOBAL CONCERN

by Elaine M. Murphy

Which of the following statements are true?

- Millions of people are undernourished.
- The world now feeds more people than ever before.
- The rate of world population growth has peaked and is now declining.
- We are now adding more people to the world each year than ever before.
- The past few decades have seen spectacular advances in food production worldwide.
- Serious obstacles must be overcome before all people in the world can be guaranteed an adequate diet.
- The earth has already reached its biological limit in producing food.
- Every nation should be self-sufficient in food.

All of the above statements are true except the last two. That these seemingly contradictory situations co-exist illustrates the only simple truth about the global food and population relationship: it is complex. This essay hopes to clarify some of the paradoxes and to describe the current situation and likely prospects for feeding a hungry and growing population.

Food and Population Growth Through History

Food and population growth have obviously been inseparable partners since the first humans appeared, 2 to 5 million years ago. The availability of food is a limiting factor for human beings as it is for other animal species. However, human intelligence has devised ways to increase food availability, thus raising the limits on the number of people the earth could support. Today the earth feeds an enormous population; our earliest ancestors would gasp at both the amount of food produced in the world and the numbers of people alive.

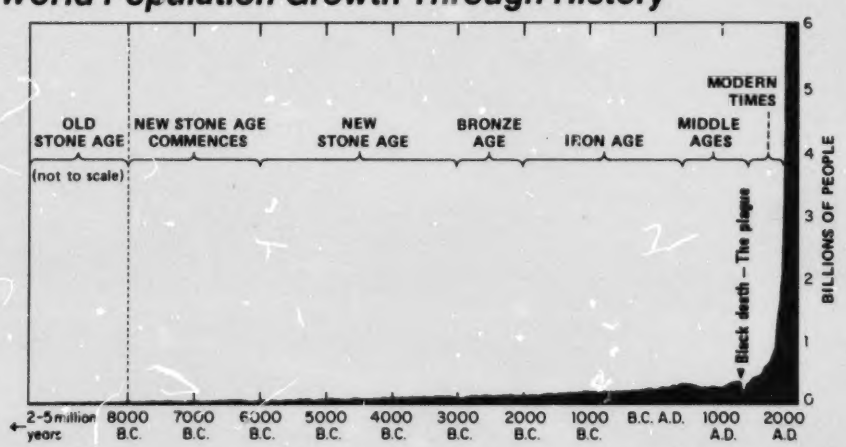
In 1983, the human population reached an estimated 4.7 billion. Almost all projections agree that world population will be at least 6 billion when we begin the next century. This would be 600 times greater than the population of the Old Stone Age, when homo sapiens was a hunter and food gatherer; during these hundreds of thousands of years the world population probably never exceeded 10 million.

About 8,000 B.C., human beings learned how to grow food and began to live in settlements. This shift from nomadic food gathering to deliberate food growing in one place was a dramatic leap forward in human survival and set off what might be called the first "population explosion." By the time of Christ in 1 A.D. there were about 300 million people—30 times more people than the highest estimated number during the Old Stone Age. The change from wandering to living in settlements led eventually to the rise of towns and cities and the new kinds of cooperation they engendered—trade, monetary systems, storage, planning, roads, communications and government, among others. Once in place, these human inventions, along with technological advances, would forever play an important role in food production and distribution.

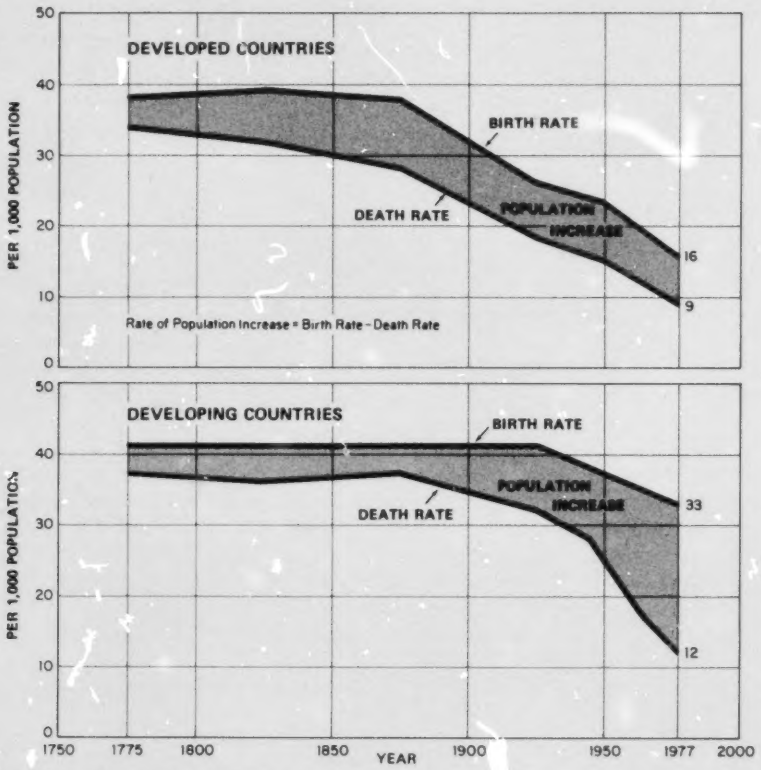
Another dramatic interplay between human ingenuity and food availability took place during the Industrial Revolution in Europe in the late 18th and 19th centuries. It led to the second "population explosion." At that time, new agricultural techniques boosted food supplies. Improved transportation systems meant that food could be shipped more readily to where it was needed. The danger of famine was lessened and individual nutrition improved greatly.

Improved nutrition was the chief reason for the rapid drop in death rates that occurred in Europe and America. Better nutrition meant increased resistance to infection and a far greater likelihood of surviving

World Population Growth Through History



Birth and Death Rates in Developed and Developing Countries, 1775-1977



Source: United Nations Population Division.

contagious diseases. In addition, living conditions gradually improved as industrialization raised personal incomes; better housing reduced incidence of diseases associated with crowding, such as tuberculosis, and improved hygiene also helped to reduce the spread of disease.

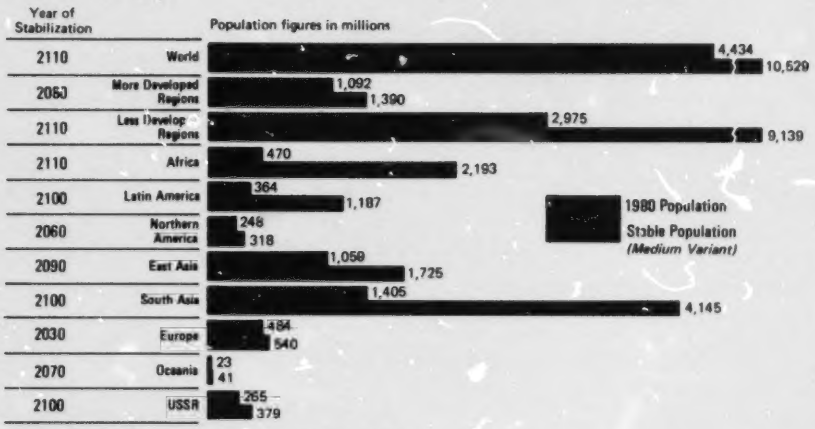
In the late 19th and early 20th centuries improved public health measures and medical advances accelerated the decline in mortality rates. Much of the decline reflected the greater survival of infants and young children who in an earlier day would have died of infectious diseases. Life expectancy correspondingly rose. At first, death rates dropped but fertility remained high, leading to rapid population growth. Eventually, fertility dropped steadily as well. Immigration to the New World also eased population pressures in Europe. This shift from high fertility and high mortality to low fertility and low mortality is called the "Demographic Transition." This pattern has been followed by virtually all the developed countries.

It is in the developing countries that the third and most dramatic "population explosion" has taken place. After the end of World War II, the death rate dropped very rapidly. Unlike the mortality decline in the West which was gradual and rooted in social and economic improvements, the developing world's mortality decline was rapid and due mostly to medical and public health technology. Among these were (and are) antibiotics, immunization, eradication of smallpox, sanitation, and insecticides such as DDT to combat malaria-carrying mosquitoes.

These changes were largely "imported" through international assistance programs and took place in decades rather than centuries. Food aid in particular has directly saved lives during famines. There has been little time for birth rates to adjust sufficiently to the rapid decline in death rates in developing countries. Thus, their populations have increased rapidly. In fact, 90 percent of the expected growth in the world's population by the year 2000 will occur in the less developed countries.

The rate of world population growth is slowing down: the growth rate peaked in the mid-1960s and has declined from a high of 2 percent to 1.8 percent a year. Birth rates have begun to fall moderately in many developing countries due to economic and social development together with family planning programs. Nonetheless, birth rates far exceed death rates. We are currently adding just over 80 million people to the world's population each year. By the year 2000, the growth rate is projected to be down to 1.5 percent a year, but because of the momentum of population growth we will be adding over 90 million a year. This

Ultimate Stable Population Compared With 1980 Population


Year of Stabilization
Population figures in millions
2110 World 4,434 10,529
2050 More Developed Regions 1,092 1,390
2110 Less Developed Regions 2,975 9,139
2110 Africa 470 2,193
2100 Latin America 364 1,187
2060 Northern America 248 318
2090 East Asia 1,059 1,725
2100 South Asia 1,405 4,145
2030 Europe 484 540
2070 Oceania 23 41
2100 USSR 265 379
1980 Population
Stable Population (Medium Variant)

Source: United Nations Fund for Population Activities.

is because there will then be many more people in their childbearing years due to previous high fertility. The United Nations now estimates that given continued decline in fertility rates, the world's population could stop growing around the year 2110—at 10.5 billion people.

Feeding the Billions

Having arrived at such a large and still-growing population is both something to celebrate and a cause for concern. We have succeeded in overcoming the forces that limited our early ancestors—scarcity of food, disease, the elements. While these ancient enemies still persist, achievements in agriculture, medicine and housing have reduced their sting.

But our success is also threatening. Will we be able to provide a decent living for the vast numbers who now survive? Can an adequate diet be guaranteed for all people alive now and for the even larger numbers expected in the future?

No one can really answer these questions. At present, hunger in the world is due to economic imbalances among nations and within nations, rather than to biologic limits of food production. If the food produced in recent years were distributed equally among all the people on the planet, there would be a more than adequate diet for everyone. Nor will we approach the biological limits soon. If modern farming techniques were applied worldwide, the earth could feed the much larger population of the future as well.

For now, nations and people who can afford an adequate diet purchase it. While the world as a whole must be self-sufficient in food, not all nations need be. If a country has natural resources such as minerals or oil, it may be far more advantageous to sell those commodities on the world market and to purchase needed food with some of the profits than to try to produce more food. Saudi Arabia is an example. Other countries, such as Japan, are not self-sufficient in food but export profitable manufactured goods and technology. The "balance of trade" must be favorable enough so that food purchases from others do not eat up most of the profits from exports. This is not the case in certain poor countries like Bangladesh or Tanzania where 80 percent of export earnings are now spent on food imports. According to John Mellor of the International Food Policy Research Institute, should world food prices rise sharply, such countries could face disaster.*

It is in the developing countries that rapid population growth plays an important role, putting pressure on agricultural land and food supplies, thus helping to drive up food costs. Governments which are swamped with providing the basic necessities for rapidly growing populations find it almost impossible to accumulate enough money for investments in industry or modernization of agriculture. Rapid population growth in less developed countries increases greatly the number of the poor and, therefore, hungry people.

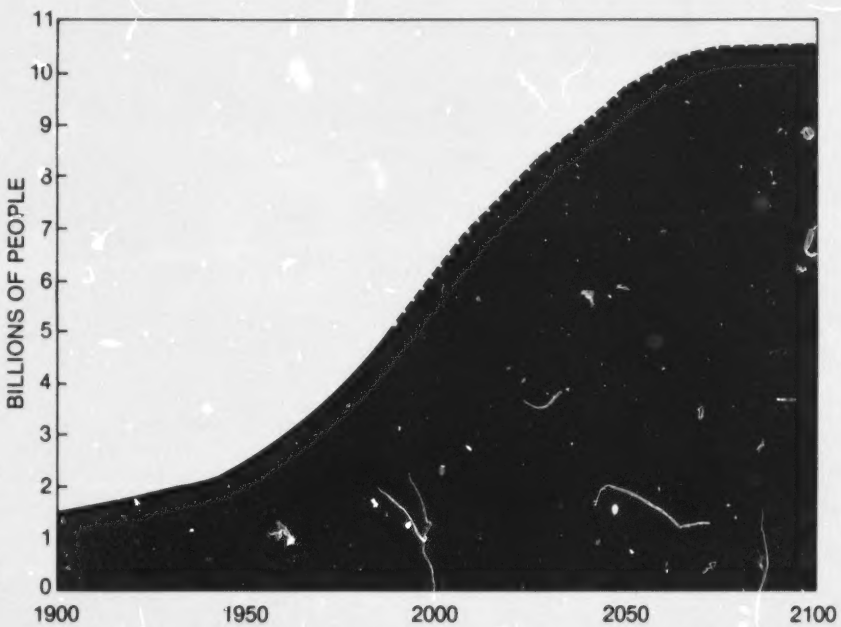
Currently, the number of undernourished people is estimated at 500 million—approximately one out of every nine people—almost all of them in developing countries. It must be noted that estimates of the number of malnourished people vary and depend on what one means by "hunger" or "malnutrition." In any event, it is safe to say that millions of people lack adequate diets.

Agricultural Miracles

It seems hard to believe that there can be so many hungry people when in the past few decades, a "miracle" has taken place in food production. The worldwide output of food in the last 30 years is almost double the rate of earlier periods. This is due to the application of scientific farming technology. The "Green Revolution," as it is called, is the result of research which produced new varieties of high-yielding, disease- and pest-resistant wheat and rice. Irrigation, herbicides, insecticides, fertilizer, and improved farm machinery added their essential contributions. The result was truly a great leap forward, particularly in developing countries. India, for example, having been the world's second largest cereal importer in 1966, was self-sufficient in cereals by the late 1970s.

In spite of the miracle technology

World Population Growth, 1900-2100



Source: United Nations Population Division.

*As reported by Ann Crittenden in "A World to Feed," *The New York Times*, August 16, 1981.

available, many millions of farmers in the developing world have not benefited. In some cases, the price of the inputs—oil to run machinery or fertilizer—was too high. In others the technology was not suitable for the particular climate and soil, or adequate rainfall, irrigation or flood control was not available. Careful research can lead to adaptation of the international varieties of grain to local conditions, but in many cases adequate research facilities or personnel were not available.

Another important reason that many farmers did not take advantage of the Green Revolution was that, in many cases, there was no advantage: the market prices for crops and other incentives were insufficient to motivate them to produce more food. This often happens when governments set the price farmers can charge for food; it helps the consumers in the short run and adds to politicians' popularity, but dampens the farmer's desire to increase output. Agricultural protection policies of the developed countries, which limit developing countries' access to their markets, have a similar dampening effect on production. In the poorest countries, transportation and marketing networks are often insufficiently developed to move out and sell increased farm output.

Growth Rates of Food Output by Major World Regions, 1960-1980

Region and Country Group	Food Output			
	Total		Per Capita	
	1960-70	1970-80	1960-70	1970-80
Developing countries[a]	2.9	2.8	0.4	0.4
Africa	2.6	1.6	0.1	-1.1
Middle East	2.6	2.9	0.1	0.2
Latin America	3.6	3.3	0.1	0.6
Southeast Asia	2.8	3.8	0.3	1.4
South Asia	2.6	2.2	0.1	0.0
Southern Europe	3.2	3.5	1.8	1.9
Industrial free market countries	2.3	2.0	1.3	1.1
Nonmarket industrial countries[b]	3.2	1.7	2.2	0.9
Total world	2.7	2.3	0.8	0.5

[a]Excluding China.
[b]U.S.S.R., Poland, Bulgaria, Hungary, Czechoslovakia, East Germany.
Source: The World Bank, *World Development Report 1982* (New York: Oxford University Press, 1982), Table 5.1, p. 41. Reprinted with permission.

Per capita food output is calculated by dividing food production by population size. In the decades described above increases in food production were offset by increases in population, resulting in a much smaller gain or loss in per capita food production.

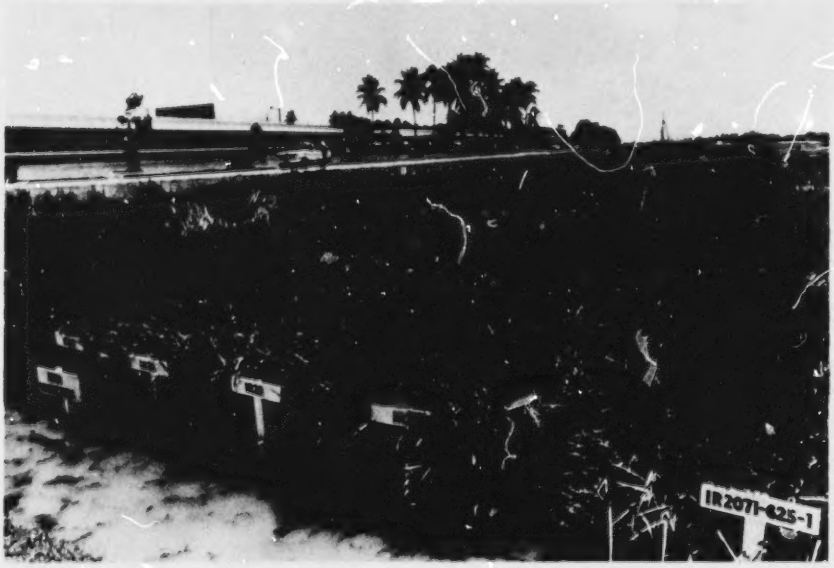
Food, Population and Poverty

Figures for world food production do not reflect the great variety among countries. For example, the United States produces far more food than it can consume. Latin America and Southeast Asia have made impressive gains. However, in the U.S.S.R. and in many developing countries, including the population giant China, food production lags far behind required amounts.

In South Asia and Africa in particular, food production has not kept pace with population growth. During the 1970s, food output increased 2.2 percent a year in South Asia; because population also grew at that rate, per capita benefits were virtually canceled. In Africa the situation was worse: because the rate of population growth exceeded the 1.6 percent increase in food production, the per capita share of food actually declined by over 1 percent a year.

Even within countries, rates of food output vary. In India, for example not all areas have the fertile soil, flood control or drainage and irrigation systems necessary to produce the Green Revolution's increased crops. Similarly, rates of consumption of food vary widely within countries according to the purchasing power of its citizens. A country may have an adequate average food supply per person but, because income is not distributed equally in a country, this means that the wealthier have diets above the minimum required and the poor have diets below the minimum. When incomes improve in a country, the rising middle class will purchase and consume more food, especially more meat. This drives prices up and leaves the poor even worse off.

While sound government policies and technology or their absence can accelerate or retard food production, poverty is the chief cause of hunger for individuals. The World



WORLD BANK PHOTO by Edwin G. Huffman

Different strains of experimental rice are grown at this research institute which contribute to the Green Revolution.

Bank estimates that about one billion people live in absolute poverty, their meagre supply of food, clothing, shelter and fuel often in danger of disruption. This figure includes an estimated 150 million poor people in China.

Over 90 percent of the poor are rural dwellers who work on farms or do farm-related work. Almost 25 percent of them are landless laborers. They are the most vulnerable when crop failures mean job layoffs and higher food prices. These landless are the chief victims of famine. Ironically, modernization of agriculture calls for fewer farm workers and will eliminate even more jobs in rural areas. This may be the inevitable path of modernization but many adjustments lie ahead.

Inequitable patterns of land ownership are often a root cause of poverty and hunger. In many developing countries, the vast majority of farmland is owned by a small minority who farm only a portion of their land holdings. The poor are left with small pieces of land and are unable to obtain credit for improving their farms. To a large extent, the Green Revolution has not touched them.

WORLD BANK PHOTO by Ray Witlin

A worker sprays a canal to control schistosomiasis—a debilitating disease carried by snails.

Biological Constraints

The fact that the earth has not reached its biological limits of food production does not mean that there are no biological constraints (see "Land Resources for Population of the Future" on page 10). Where the technology of the Green Revolution has been intensively applied, the results have been spectacular. However, the rate of increase has not been sustainable; there is in these places a good but diminishing rate of return on the investment.

The world's best farmland is already being farmed, although production can be boosted greatly by applying modern technology throughout. More potentially arable land can be brought into production as well. One World Bank calculation indicates that, given estimated population growth in the next decade, $600 billion will be required just to maintain food supplies at the present per capita level in developing countries.

That same growing population also puts pressure on arable land for other purposes. Residential, industrial, commercial and recreational uses, transportation, mining and mineral extraction, and preservation of natural habitats all compete with agricultural, pasture and forestry uses. Urbanization alone eats up millions of acres of cropland yearly, forcing farmers to turn to increasingly marginal lands which require expensive inputs (fertilizer and irrigation, for example) to make them productive. In Egypt, urbanization has claimed as much fertile soil as the Aswan dam has made available through irrigation in the past 20 years.

The worldwide loss of productive soil is a serious problem. As forests are chopped down for commercial profit or for fuelwood for the poor, soil is lost through erosion and flooding. Erosion from other causes —often due to the lack of sound conservation practices—leads to a reduction in crop yields and the need for expensive inputs to compensate for poor soil quality.

Other biological problems include an increase in salinity and alkalinity of soil from irrigation of fields (irrigation has also led to an increase of water-borne diseases such as schis-

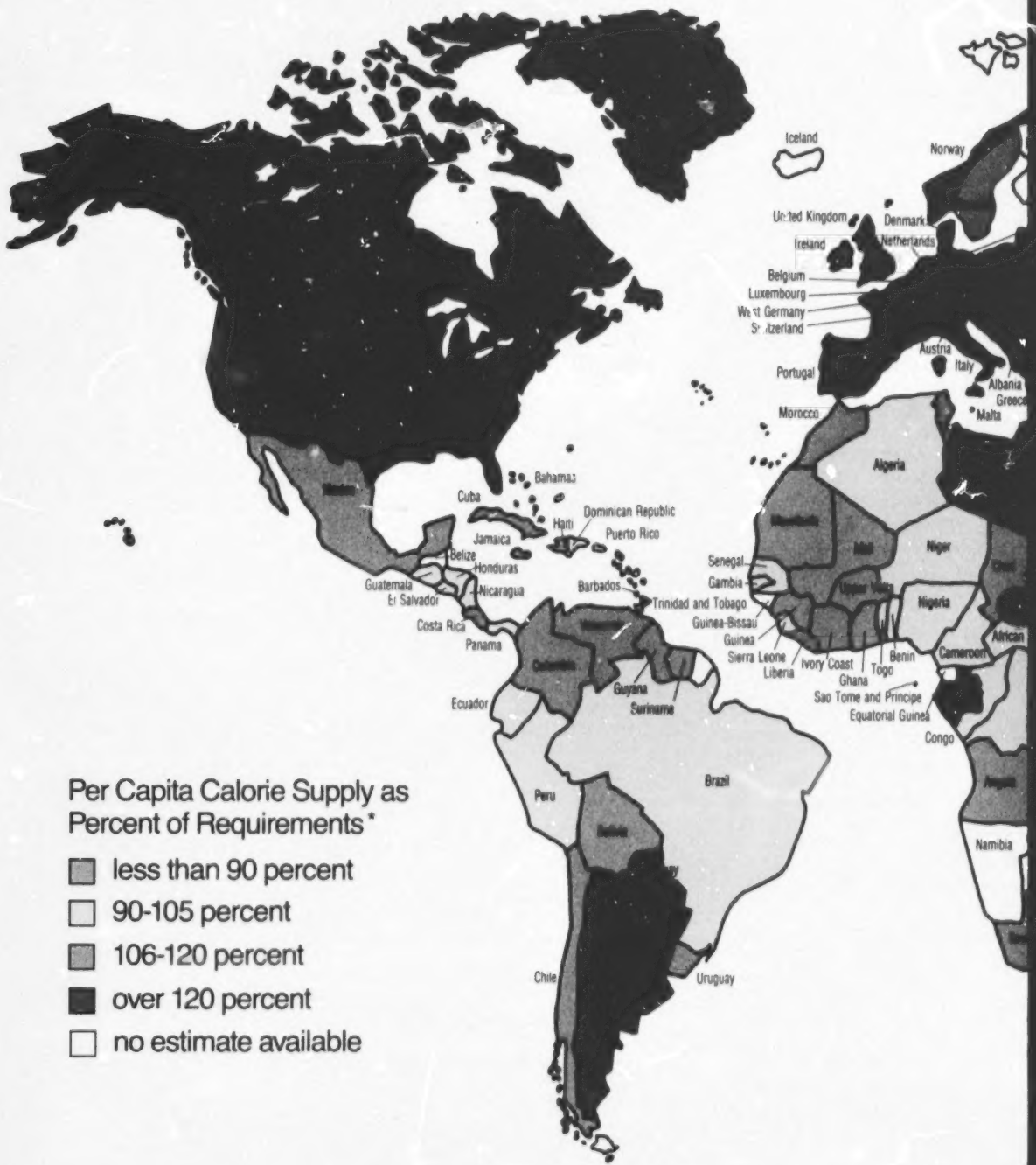
Agricultural Labor Force as a Percentage of Total Labor Force, 1970-2000

	1970	1980	1990	2000
	(figures in millions)			
Developed countries				
Labor force	484	542	583	623
Agricultural labor force	92	70	52	37
Agricultural labor force as percentage of total labor force	19%	13%	9%	6%
Developing Countries				
Labor Force	1,068	1,286	1,546	1,884
Agricultural labor force	716	772	804	810
Agricultural labor force as percentage of total labor force	67%	60%	52%	43%

Source: The Food and Agriculture Organization, *World Food Report 1983* (Rome: Food and Agriculture Organization, 1983), pg. 50.

In both developed and developing countries the percentage of the labor force in agriculture will decrease. However, due to rapid population growth the absolute number of people employed in agriculture in the developing world will increase.

World Calorie Consumption



*Percent of estimated calorie intake required to maintain moderate physical activity that is actually

Source: *1983 World Population Data Sheet* (Washington, D.C.: Population Reference Bureau, World Bank. Estimates refer to the 1978-1980 period.

n each country.

d on UN Food and Agriculture Organization estimates provided by the

tosomiasis in developing countries).

Irrigation is also rapidly reducing the level of groundwater. Overuse of pesticides contaminates soil and food, destroys pests' natural predators, harms other species and encourages the growth of pesticide-resistant strains of insects. The constant growing of one crop—monoculture—leads to vulnerability to disease or pests (the Irish potato famine is an example from the 19th century) and reduction of genetic diversity needed for improving plant varieties. Some studies suggest that land degradation due to these practices could result in the loss of one-third of currently arable land by the year 2000.

Countries With Calorie Surpluses Or Deficits

	Per capita calorie supply as % of requirements	Life expectancy at birth (years)	Per capita Gross Nat'l Product US $	Total fertility rate*	Infant mortality rate**
Calorie surplus countries: the top ten					
Belgium	149%	72	$11,980	1.7	11.7
Luxembourg	149	72	13,900	1.6	11.0
Ireland	149	73	5,350	3.2	11.2
Bulgaria	145	72	4,413	2.0	19.5
Greece	145	73	4,540	2.3	17.9
Libya	144	57	8,560	7.3	99.0
Italy	144	73	6,830	1.6	14.1
East Germany	142	72	7,286	1.9	12.3
Czechoslovakia	140	70	5,610	2.1	16.8
United States	138	74	12,530	1.8	11.4
Calorie deficit countries: the bottom ten					
Ethiopia	74%	40	$142	6.7	146.0
Afghanistan	75	40	not avail.	6.9	205.0
Chad	75	40	not avail.	5.9	147.0
Uganda	79	54	356	6.1	96.0
Zimbabwe	79	53	815	6.6	73.0
Mozambique	80	47	240	6.1	114.0
Dem. Kampuchea	80	37	not avail.	4.7	201.0
Guinea	83	45	298	6.2	164.0
Haiti	83	52	297	5.5	113.0
Mali	84	43	185	6.7	153.0

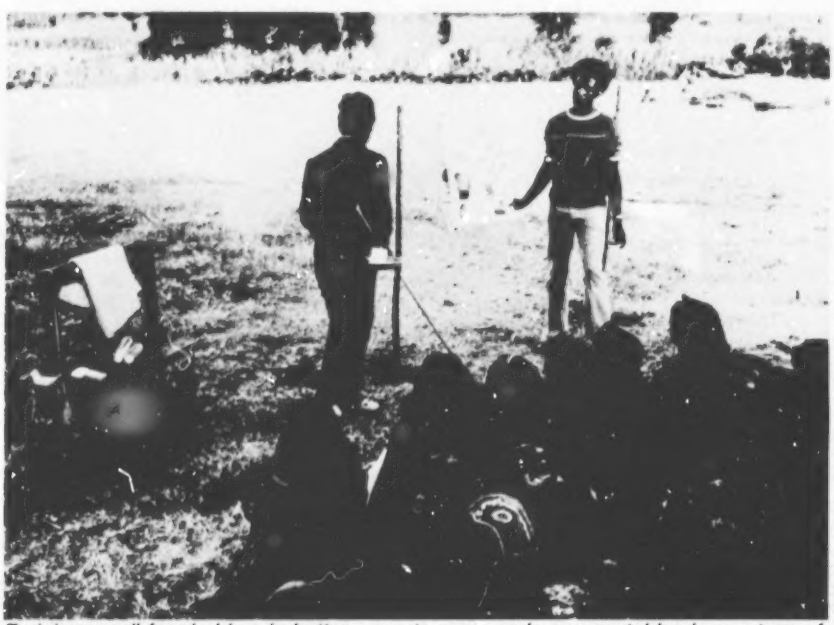
*An estimate of the average number of children per woman
**The number of deaths to infants under one year of age per 1,000 live births.
Source: *The 1983 World Population Data Sheet* (Washington, D.C.: Population Reference Bureau, Inc., April 1983).

Food Aid or Development?

The World Food Conference in 1974 recommended the establishment of an international wheat reserve system. During times of emergency, wheat reserves could be released so that prices do not rise above the reach of poor countries. Almost a decade later, the worldwide wheat reserve system has not materialized. However, the United States did guarantee a wheat reserve of 4 million metric tons to be used in cases of severe food shortages to backstop its food aid.

Food aid levels in the early 1980s averaged about 9 million tons a year, 6 million of which are from the United States. According to the FAO, three times as much food aid is needed in low-income developing countries. The FAO and other food groups still advocate an international food security reserve of 9 to 18 million tons to help stabilize prices during food shortages.

While emergency food aid is important, most experts say that the only lasting answer is an increase in food production in the developing countries. Emphasis must be placed on aid which helps these nations to become self-sufficient through investments in agriculture improvement and/or other sectors which improve the overall economy and, therefore, purchasing power. The United Nations, the World Bank, the U.S. Agency for International Development and other international donors and lending institutions now focus on projects which increase a country's level of technology and "know-how"; skilled workers, planners and managers;



WORLD BANK PHOTO by Ray Witlin

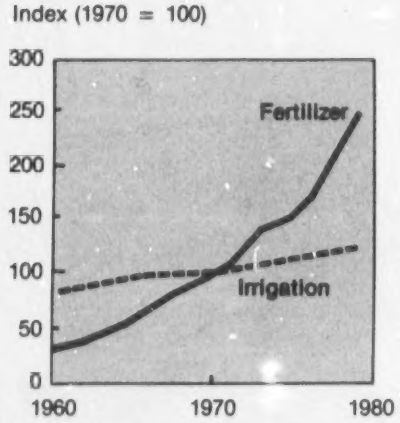
Training small farmholders in better ways to grow and use vegetables is one type of development assistance.

infrastructure (transportation and communication systems); and other factors necessary to produce a momentum of economic growth. The hope now is that transfers of technology will be culturally appropriate, will be self-sustaining and will benefit everyone (women and the poor have actually been left worse off as a result of some kinds of foreign aid). The kind of project that people themselves help to plan and implement is more likely to be successful than those with little involvement of the recipients. Following are some examples of recent projects foreign aid has made possible in cooperation with recipient countries:

• **Central Java, Indonesia.** A decade ago, malnutrition was common, with resulting high infant mortality and illnesses. Today, improvement is obvious. Traditional goats have been replaced with species that produce almost four times more milk. Fish farming has increased food security and families have been taught to cultivate fresh vegetables. As a result, the number of calories and protein consumed per day has risen dramatically, and health has improved.

• **The islands of Zanzibar and Pemba in Tanzania.** There is an acute shortage of food; 40 million pounds of rice are imported annually which drains foreign exchange from needed development projects. Research on soil, climate, farming techniques and varieties of rice have proved that harvests could double under rainfed conditions and increase fivefold through irrigation and multiple cropping. One thousand farmers are now cultivating 50 high-yield strains of rainfed rice; one thousand acres are now under irrigation. Extension agents are providing training in modern techniques.

Agricultural Inputs in Developing Countries, 1960-1979



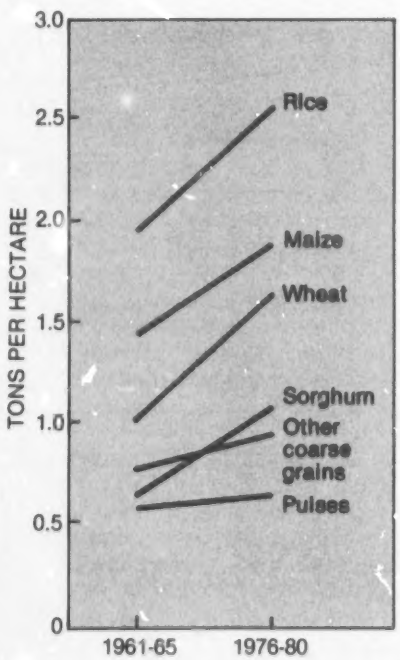
Source: The World Bank, *World Development Report 1982* (New York: Oxford University Press, 1982), Figure 6.4, pg. 61. Reprinted with permission.

• **Sri Lanka.** After feasibility studies of soybeans as a cash crop, acreage under cultivation was increased 30 times. The Soy Foods Research Centre developed new soy products—breads, noodles, soya milk, yogurt, ice cream, margarine, soups, soy flour, low-cost baby foods, "peanut butter," and "bacon." A government-built factory will produce a substitute for popular coconut milk which will allow Sri Lanka to export up to 10 million more coconuts per year. This project simultaneously will raise nutritional standards, stimulate rural employment and earnings and increase earnings from foreign exchange.

• **Egypt.** The Population and Development Project (PDP) aims to integrate population and development planning in rural areas where infant mortality and birth rates are very high. Rapid population growth in rural Egypt is seen as an obstacle to economic and social improvement—including diets—and contributes to an undesirably high rate of migration to urban areas (where arable land is turned into blocks of apartments). PDP is a community-based program which introduces

WORLD BANK PHOTO by Kay Chumush

Food Grain Yields in Developing Countries, 1961-65 and 1976-80



Source: The World Bank, *World Development Report 1982* (New York: Oxford University Press, 1982), Figure 6.6, pg. 71. Reprinted with permission.

the population issue and family planning into many development activities. Among them are educational facilities, transportation, communication, village cottage industries, employment opportunities and agricultural mechanization. Local government leaders and volunteers set targets and develop programs for population growth reduction. Preliminary results show that PDP is associated with increases in use of modern family planning methods, decreases in child deaths, increases in female employment and decreases in the desired number of children per family.

Foreign assistance also benefits the donors. In addition to moral considerations concerning helping the less fortunate, countries which give aid have reason to believe that helping a developing country become more prosperous makes for a more stable world—to the benefit of all. In an interdependent world, the supply of minerals and other needed commodities is more secure. A more prosperous developing country also creates new markets for industrialized nations' products. Regulations attached to some foreign assistance calls for purchase of equipment and provision of technical advisors from the donor country, thus recycling a proportion of the donated money back to the gift-giver.

* * *

The developed countries can play a crucial role in helping developing countries realize their own agricultural potential. Food aid for emergencies is necessary but in the long run the transfer of appropriate technology accompanied by in-country training and research are better investments. International grain reserves could help stabilize prices and permit better long-range planning.

In turn the developing countries must re-examine policies which discourage an increase in farm productivity, such as setting the market price for food unrealistically low to benefit urban populations. Land ownership patterns must be addressed as well; farmers work harder and produce more when they get a greater share of the results. Small farmers must be given incentives, such as access to

Land Resources for Populations of the Future Project

At subsistence levels of farming, the entire cultivable lands of the developing world—three or four times the present cultivated area—would barely be able to support the expected population for the year 2000. Sixty-five countries would be unable to feed their population from their own lands at the end of the century.

These are the most alarming findings of a new study of land resources and population-supporting capacity in 117 [developing] countries, carried out by the Food and Agriculture Organization with funding from the United Nations Fund for Population Activities.

The study is the most thorough and scientifically based effort so far undertaken to determine just how much food the lands of the developing countries are capable of producing and how many people they could feed at different levels of farming. It is based on detailed soil and climate maps and the growth patterns and requirements of 18 major food crops. . .

Looked at on a global scale, the results look misleadingly reassuring (see table). Even at low farming levels, the lands of the developing countries studied (East Asia and a few small islands were not included) could support one and a half times their expected populations for AD 2000. With intermediate inputs, they could support four times the expected numbers, and with high inputs no less than nine times.

But the closer the results come to national and local levels, the more alarming do they become. . . .

These show that by the year 2000 no less than 65 countries, with a population of 1,065 million (29 percent of the developing world total), will be unable to feed their population from their own land with the low level of inputs. The number of people in excess of their carrying capacity would be 440 million. Some 30 of these critical countries would be in Africa (out of a regional total of 51 countries); 15 would be in Southwest Asia (out of 16); 14 would be in Central America and the Caribbean (regional total 21); and six in Asia (out of 16). None of the 13 countries in South America would be critical.

Raising the level of farming has a dramatic effect on the results. Twenty-nine of the 65 critical countries would cease to be so if they could achieve intermediate inputs, while another 17 could become self-sufficient in food if they could reach high levels of inputs. But 19 countries, with a total population of 104 million, would remain unable to feed their year 2000 populations even with the most advanced farming methods. Twelve of these would be in Southwest Asia.

Thus, the potential for food production, and therefore the capacity to support populations from the land, is very unevenly distributed among countries. The emergence of fixed national boundaries has made the problem much more intractable than it might have been in the past. For example, five countries in East Africa will be critical in AD 2000 even with intermediate inputs, yet they are close to countries in Central Africa that could support 13 or more times their expected populations with intermediate inputs. In the 19th century, farmers from the overcrowded hills of Rwanda or Burundi would simply have migrated in large numbers into Zaire. Today that option is not open. . . .

How it was done

The methodology of the study was extremely complex. The detailed FAO/UNESCO World Soil Map (scale 1:5,000,000) provided localized data on soil types, the slope of the land, and other physical characteristics that affect productivity. A separate climate map was prepared, based on patterns of rainfall, temperature and solar radiation, which divided the developing world into major climates and into many hundreds of "length of growing period zones"—areas within which conditions were suitable for plant growth for a given number of days in the year (for example, 0-75 days, 75-90, 90-120 and so on).

The crucial step was to superimpose the climate map over the soil map,

thus producing a fine mosaic of tens of thousands of land units with distinctive land and climate characteristics. For each cell in this mosaic, a complicated computer program (designed and run by the International Institute for Applied Systems Analysis in Vienna) calculated the potential yields for every one of the major food crops that could be grown there.

The one crop that gave the optimum yield was selected for each area, and the yield in terms of calories calculated. These finely detailed results were then clumped together, by country, by climate and by length of growing period zone. The calorie production of each area was converted into a figure for population carrying capacity simply by dividing the average recommended calorie intake for each country.

Comparison with the 1975 populations enabled the project to pinpoint which areas could not support their populations, while comparison with populations expected on the UN medium variant in the year 2000 made it possible to predict which countries and regions would be critical in the future.

Population Supporting Ratios

The figures in these tables indicate the number of times by which the potential population carrying capacity of the land exceeds the actual or expected population for the year stated.

Input Level	Africa	Asia	SW Asia	South America	Central America	Total
A. Year 1975 populations, all cultivable land under food crops.						
Low	2.7	1.1	**0.8**	5.9	1.6	2.0
Intermediate	10.8	3.0	1.3	23.9	4.2	6.8
High	31.6	5.1	2.0	57.2	11.5	16.3
B. Year 2000 populations, all cultivable land under food crops.						
Low	1.5	1.1	**0.7**	3.5	1.4	1.5
Intermediate	5.4	2.3	**0.9**	13.3	2.6	4.1
High	15.6	3.3	1.2	31.5	6.0	9.1

Bold type indicates critical figures, where region cannot support its population. But any figure below 2 indicates a tight situation.
Source: Land Resources for Populations of the Future, FAO, 1983.

Because farming practices such as fertilizer use have a strong effect on yields, all the calculations were done for three levels of farming: a *low level* of inputs— roughly what you might find in a rural area of a Least Developed Country—using no fertilizer or chemicals, traditional seed varieties and cropping patterns, and no conservation measures; an *intermediate level*, using a basic package of fertilizers and chemicals, with some improved seed varieties, simple conservation methods, and the most productive crop mix on half the land—this level might correspond to that found among medium and small farmers in development project areas in Asia. And a *high level* of farming, corresponding roughly to North America, with high doses of fertilizer, full use of chemicals, improved seed varieties and conservation practices, and the ideal mix of crops on all the land.

There was no attempt in the first phase of the project to decide where individual countries or regions came on this scale. But most farmers in Africa would be at the low level of input use; in Asia and Latin America commercial farmers might be at the intermediate level, but the majority of small farmers would be somewhere between low and intermediate.

There was also no attempt to assess whether countries unable to produce sufficient food from their own land possessed—or could develop—secure sources of foreign exchange with which to buy imported food. For those that have such sources, inability to feed their population from their own land is less of a problem.

Excerpted from "Land and People: the Growing Pressure," by Paul Harrison, *Earthwatch* No. 13, (London: International Planned Parenthood Federation, 1983). Harrison is a consultant to the FAO project, Land Resources for Populations of the Future.

loans, to help increase the productivity of their land.

Since poverty is the root cause of hunger, any development effort which reduces poverty will reduce hunger as well. The reduction of rapid population growth is also important as it will buy time for agricultural reform, relieve pressure on land for competing purposes (urban housing, roads, and mineral extraction, for example), and reduce the poverty of individual families and nations. If concerted efforts are made in all three areas—economic development, agricultural productivity and reduction of population growth—the battle against hunger will be won.

References

Analyzing Growth Policies of Developing Countries: A Resource Guide by Robert Highsmith, Lyman H. Heine and Phyllis Bailey. New York: Joint Council on Economic Education, 1983.

"Confronting World Hunger" by Barbara Huddleston. *Care Briefs on Development Issues* No. 3. New York: Care World Headquarters, 1983.

The Environment to Come: A Global Summary by Elaine M. Murphy. Washington, D.C.: Population Reference Bureau, 1983.

"Food Policy Issues in Low-Income Countries" by Robert Chambers, et al. *Staff Working Paper No. 473.* Washington, D.C.: The World Bank, 1981.

"Land and People, the Growing Pressure" by Paul Harrison. *Earthwatch* No. 13. London: International Planned Parenthood Federation, 1983.

Population and Development in Rural Egypt by Allen C. Kelley, Atef M. Khalifa and M. Nabil El Khorazaty. Washington, D.C.: U.S. Agency for International Development, 1982.

Promises to Keep by the United Nations Development Program. New York: U.N. Development Program.

World Development Report 1982. Washington, D.C.: The World Bank, 1982.

1983 World Population Data Sheet, prepared by Mary Mederios Kent. Washington, D.C.: The Population Reference Bureau, 1983.

"A World to Feed," a series of 17 articles by Ann Crittenden. *The New York Times*, August 16 to December 7, 1981.

FOR FURTHER READING AND RESEARCH

From the Population Reference Bureau

"The Changing U.S. Farmland Scene" by Michael Brewer. *Population Bulletin,* Vol. 36, No. 5, December 1981. 40 pp. $4.00 per single copy; 2-10 copies, $3.00 each; 11-50 copies, $2.50 each; 51 or more, $2.00 each.

An examination of the adequacy of U.S. cropland to meet future domestic and international demand for food and fibers.

The Environment to Come: A Global Summary by Elaine M. Murphy. March 1983. 13 pp. $2.00 per single copy; 2 or more copies, $1.75 each.

A summary of six major reports on the outlook for global population, resources and the environment in the year 2000.

"Population Growth and Poverty in the Developing World" by Nancy Birdsall. *Population Bulletin,* Vol. 35, No. 5, December 1980. 48 pp. (See prices for *Population Bulletin* listed above.)

An examination of the links between rapid population growth and absolute poverty in the developing world.

"World Food Resources and Population: The Narrowing Margin" by Lester Brown. *Population Bulletin,* Vol. 36, No. 3, September 1981. 44 pp. (See prices for *Population Bulletin* above.)

A description of the necessary steps to a sustainable food supply for the world's population.

World Population Data Sheet, prepared by PRB demographers. Issued annually in April. 18½" x 24" wall chart. $2.00 per single copy; 2-49 copies, $1.75 each; 50 copies or more, $1.50 each.

Fourteen columns of population and development data for the world, its major regions and 171 countries.

World Population: Toward the Next Century by Elaine M. Murphy. November 1981. 17 pp. $2.00 per single copy; 2 or more copies, $1.75 each.

A self-contained student booklet on world population trends with a reading, the World Population Data Sheet (reprinted on 4 pages), and several pages of activities and projects.

1982 World's Children Data Sheet by Carl Haub. 18½" x 24" wall chart. (See prices for *World Population Data Sheet* above.)

Fifteen columns of data on children, including food-related statistics, for 170 countries.

Send orders for Population Reference Bureau publications to PRB, P.O. Box 35012, Washington, D.C. 20013. All orders under $20.00 must be prepaid with a $1.00 shipping/handling fee included.

Other Resources

"Confronting World Hunger" by Barbara Huddleston. *Care Briefs,* No. 3, 1983. CARE Office of Education, 660 First Ave., New York, N.Y. 10016. 8 pp. Single copy free; bulk price list available. Discussion guide also available. Request list of development education materials available from CARE.

A discussion of the right to food, the location of hungry people in the world, visible and invisible hunger, and helpful policies.

To Feed This World: The Challenge and the Strategy by Sterling Wortman and Ralph W. Cummings, Jr. Baltimore: The Johns Hopkins University Press, 1978. 440 pp. $8.95.

An analysis of the world food situation, strategies for improving it, and the obstacles that must be overcome.

Food, Volume 3. Social Issues Resources Series, Inc., P.O. Box 2507, Boca Raton, Fla. 33432. 1982. $13.00.

A collection of 20 articles on food and nutrition which appeared in U.S. newspapers, magazines and journals in 1982.

Food Digest by the SIRS staff. Social Issues Resources Series, Inc. (address above). Revised edition available in Spring 1984. $30.00.

Articles about food and hunger issues for use as a basic reader by students.

Food in the Global Arena: Actors, Values, Policies and Futures by Raymond F. Hopkins, Robert L. Paarlberg and Mitchel B. Wallerstein. New York: CBS College Publishing, 1982. 146 pp. $8.95. See also *Population in the Global Arena* by Parker G. Marden, Dennis G. Hodgson and Terry L. McCoy. 169 pp. $8.95. Both volumes are part of the Global Issues Series, edited by James E. Harf and B. Thomas Trout.

A college level reader on global food issues ranging from the role of individual actors to national policies and the future. Includes exercises and activities throughout the book.

"Food Policy Issues in Low-Income Countries." *World Bank Staff Working Paper No. 473.* The World Bank, Publications Office, 1818 H St. N.W., Washington, D.C. 20433. 1981. 115 pp. $5.00.

Four papers which consider food policy issues in Zambia, Bangladesh, and India from the viewpoints of adjustment to the energy crisis and the impact of food policy on poverty, malnutrition and food security.

"Foreign Aid." *Hunger Notes,* Vol. 8, No. 10, March 1983. World Hunger Education Service, 1317 G St. N.W., Washington, D.C. 20005. 8 pp. $1.50 plus $.50 shipping and handling. A subscription to *Hunger Notes* is $12.00 per year for an individual and includes nine issues.

A description of the differences between foreign aid and development assistance and a summary of the recent role of the U.S. government in development assistance.

How the Other Half Dies: The Real Reasons for World Hunger by Susan George. Montclair, N.J.: Allanheld, Osmun & Co., 1977. 308 pp. $12.50.

An analysis of the political and economic causes of world hunger, with particular emphasis on the part played by the affluent nations.

Merchants of Grain by Dan Morgan. New York: Penguin Books, 1980. $3.95.

A political analysis of the companies that control the grain trade around the world.

Overcoming World Hunger: The Challenge Ahead by the Presidential Commission on World Hunger. Washington, D.C.: U.S. Government Printing Office, Stock No. 041-002-00016-6. 1980. 29 pp. $3.95.

The abridged version of the final report from the commission which provides a summary of the problem of world hunger and what is needed to deal with it.

Report and Recommendations on Organic Farming, prepared by the U.S. Dept. of Agriculture Study Team on Organic Farming. Washington, D.C.: U.S. Government Printing Office, Stock No. 001-000-04182-7. 1980. 94 pp. $5.50.

A study of organic farming in the U.S. and Europe, including prospects for the future and recommendations for action.

State of the World 1984 by Lester Brown, William Chandler, Christopher Flavin and Sandra Postel. New York: W.W. Norton, 1984. 300 pp. $15.95.

An assessment of world efforts to create a sustainable society.

The State of the World's Children by James P. Grant. Oxford, U.K.: Oxford University Press, 1984. Also available from The Information Division, UNICEF, 866 UN Plaza, New York, N.Y. 10017. $6.95.

An extensive summary of the condition of the world's children with specific country examples.

Who's Involved With Hunger: An Organization Guide, 3rd Edition. World Hunger Education Service, 1317 G St. N.W., Washington, D.C. 20005. 198 pp. $5.00.

A list of almost 400 organizations and agencies involved in hunger programs.

World Development Report 1982. The World Bank, Publications Office, 1818 H St. N.W., Washington, D.C. 20433. 172 pp. $8.00.

The World Bank's annual report on development trends in the world, with a special section on agricultural development.

"A World to Feed" by Ann Crittenden. *The New York Times*, August 16 to December 7, 1981.

A series of 17 articles on the world food situation which appeared in *The New York Times*.

PRB CLASSROOM MATERIALS

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Mortality American Style, November 1977
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Population Density and Mobility in the United States, September 1978
The Future and Population: What Will a No-Growth Society Be Like? December 1978
How America Studies Itself: The U.S. Census, February 1980
Population and Hawaii: A Case Study, November 1980
World Population: Toward the Next Century, November 1981
Immigration: Questions and Answers, July 1982
The Environment to Come: A Global Summary, March 1983
Food and Population: A Global Concern, December 1983

OTHER TEACHING MATERIALS
Growing Old in America: A Kit of Readings and Activities, September 1981
U.S. Population Data Teaching Kit, March 1981
Population Education: Sources and Resources, May 1979
Charts, data sheets and other materials are also available. Request a copy of the latest PRB publications order form.

All modules and teaching materials are $2.00; two or more copies of one title, $1.75 each. Orders of $20.00 or under must be prepaid. Add $1.00 for shipping and handling.

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The Paradoxes of World Hunger

At a time when the scarier scenarios of the future include nuclear holocaust, star wars, and computerized control of individuals, it is indeed a paradox that one of the worst problems to come may be one of the oldest and most familiar: hunger. There is nothing reassuring in that familiarity, however; the power of hunger to blunt the intellect and waste the body remains undiminished.

Only the dimensions of the problem are new and that is another paradox. The numbers of undernourished people have increased greatly (due to rapid population growth) while the numbers of people that the earth can feed—and feed well—have also increased greatly (due to the marvels of modern agriculture).

Continuing the paradoxes is the fact that food aid—like other forms of foreign assistance—is not only charity since one out of every six jobs in the U.S. depends on world trade. However, some kinds of foreign aid offer no aid at all in solving hunger problems and can even worsen them; and rising standards of living for an emerging middle class in a developing country can drive food prices out of the range of the poorest people. The simple act of eating is in reality the final link in a complex chain of food production and distribution.

The module accompanying this issue of *Interchange, Food and Population: A Global Concern* hopes to clarify some of the paradoxes and to describe the current situation and likely prospects for feeding a hungry and growing world population. In the limited space of the reading, it was impossible to explore fully a subject so large and complex as world hunger. However, additional topics for debate, research and discussion, and a selected bibliography are included for students' own investigations.

The module deals with the following aspects of world hunger: how the human population became so large, the extent and location of world hunger, recent agricultural miracles, the role of poverty and population growth, biological constraints in food production, the questions of food aid versus development aid, examples of successful aid and, finally, some recommendations for addressing world hunger problems. The reading also includes an excerpt from *Earthwatch* (see references) describing an important and sobering new study of the UN Food and Agriculture Organization, "Land Resources for Populations of the Future."

World Bank Photo by Ray Witlin

CLASSROOM ACTIVITIES

The following activities give the instructor many options; use all or some; adapt or expand on them.

Checking the Facts

The questions below can be used as an open book exercise, a quiz for class discussion, or a pretest/posttest measure of the students' understanding of the module. Answers to the questions are in parentheses for the teacher's use.

1. What was the estimated population of the world in 1983? *(4.7 billion)*
2. How many people are there likely to be in the year 2000? *(6 billion)*
3. During the Old Stone Age, the world population probably never exceeded what number? *(10 million)*
4. What happened around 8,000 B.C. that enabled population to grow more rapidly? *(The beginning of agriculture.)*
5. How did the Industrial Revolution contribute to a "population explosion"? *(Primarily by expanding food supplies and thus reducing death rates.)*
6. Why are developing countries growing faster than the developed countries? *(The developed countries have now achieved both low birth*

World Bank Photo by Kay Chernush

rates and death rates so that their rate of population growth is low. Developing countries have in many cases achieved low death rates but their birth rates are still very high, leading to rapid growth.)

7. How does the current drop in death rates in developing countries differ from the earlier drop in death rates in Europe? *(It happened suddenly and was imposed from the outside.)*

8. Have we reached the biological limits of food production? *(No, there is enough food to feed today's population and the earth could produce enough for the projected stable population of 10.5 billion.)*

9. What are the main causes of world hunger? *(Poverty is the primary cause. Maldistribution of food supplies is another.)*

10. Must each nation be self-sufficient in food production? *(No, a country could export natural resources, goods or services and buy food with the foreign exchange it earns.)*

11. What is the most common estimate of the number of undernourished people? *(500 million)*

12. What are the components of the Green Revolution? *(High yielding varieties of wheat and rice, irrigation, herbicides, pesticides, fertilizer and improved farm machinery.)*

13. Why have many farmers not benefited from the Green Revolution? *(The price of the inputs is too high; the technology is not suitable for the climate and soil; lack of irrigation or flood control; and lack of incentives to produce more.)*

14. In which areas has food production *not* kept pace with population growth? *(South Asia and Africa)*

15. According to World Bank figures, how many people live in absolute poverty? *(About 1 billion)*

16. What are some environmental problems leading to a loss of productive soil? *(Deforestation which leads to flooding and erosion, increase in alkalinity or salinity due to irrigation, overuse of pesticides which contaminates the soil, loss of genetic diversity due to monoculture, loss of soil through urbanization.)*

17. Why is aid for agricultural development better than outright food aid? *(Agricultural development will help a poor nation to become self-sufficient and/or to improve its overall economy.)*

18. Could all geographic areas of the world feed themselves in the year 2000 using subsistence methods of farming (little or no modern inputs)? *(No, according to an FAO study, Southwest Asia could not feed itself and only South America would not be in a critical situation.)*

Additional copies of *Food and Population: A Global Concern* and this issue of *Interchange* are available from PRB at the following prices: $2.00 per single set; 2 or more sets, $1.75 each. Please prepay your order if under $20.00 and add $1.00 for shipping and handling.

Observing and Comparing

Using the table "Countries with Calorie Surpluses or Deficits" in the module (see page 8), ask students to answer the following questions:

1. What general patterns (there may be an exception) do you observe in the calorie surplus countries in terms of:
a) life expectancy:
b) per capita GNP:
c) total fertility rate:
d) infant mortality rate:
2. What general patterns do you observe in the calorie deficit countries in terms of:
a) life expectancy:
b) per capita GNP:
c) total fertility rate:
d) infant mortality rate:
3. What country or countries represent an exception to the general pattern? In what way do they differ? Why are they different?
4. Why do you think certain characteristics—such as the infant mortality rate or GNP per capita—accompany adequacy or inadequacy of food intake?

Brainstorming

Ask the class to try to come up with as many answers as possible—no matter how "far out"—to the following questions. Write them on the blackboard or flipchart. Then discuss them and try to narrow the list to the more realistic responses.

1. What would be some of the consequences of shipping surplus food from the U.S. and other food exporting countries to poor countries as foreign aid?
2. What benefits do foreign aid donors get or hope to get from foreign aid?
3. What are the best ways to increase food productivity in developing countries?
4. What are the best ways to reduce poverty in developing countries?
5. What are the best ways to reduce rapid population growth in developing countries?
6. What are the environmental consequences of modern farming techniques?
7. What land uses compete with agriculture for available land?

8. What can be done to prevent or reduce food loss through waste, vermin and corruption?
9. How can food distribution systems be improved?

Reaching a Consensus

Divide students into small groups of 4-6 people each. Each group should choose one or two of the following positions and try to reach a consensus on them. Have each small group report their discussion to the whole group.

1. Developing countries have a right to food aid and developed countries have an obligation to provide it.
2. No agricultural development aid should be given to countries that lack a plan to reach the poorest of that country.
3. Most developing countries should aim for self-sufficiency in food production as a goal.
4. Food deficit countries should not grow non-nutritive crops such as coffee, tea or tobacco on their farmland.
5. Food aid creates dependency.
6. If we conquer world hunger can we conquer poverty.
7. Once a country has been given development aid, it in turn has an obligation to repay it or to give aid to other developing countries once it has become developed.

Topics for Research and Discussion

The following questions will require outside research by the students. Refer them to the resources listed at the end of the module and to the free materials available from the Food and Agriculture Organization (see "Teacher Resources"). Answers or findings can be discussed in class or presented as research papers by the students.

1. What is a sound diet?
2. Is vegetarianism an answer to world hunger?
3. Identify nutritional requirements in different parts of the world: how do they differ?
4. What are the benefits and drawbacks of pesticides?
5. What are the promises of organic farming?
6. What is the "greenhouse effect"?
7. What is the impact of oil prices on agricultural modernization?
8. What are the miracle seeds of the Green Revolution?
9. Describe the agricultural picture of a particular country (for example, Russia, China, the United States, Ethiopia, Egypt, or Upper Volta).
10. What is the role of multi-national food corporations in world hunger?
11. What is the role of foreign aid in world hunger?
12. What are the political aspects of hunger?
13. Describe the hunger situation in developed nations (for example, in Appalachia, USA).
14. Should we pay farmers not to grow food or to ship surpluses to poor countries?
15. What are the contributions of women to food production in developing countries?
16. What is the impact on women of modernization of farming?
17. What is the relationship of fertility and agriculture in poor countries?
18. What is the impact of malnutrition on health and mortality?
19. Write a case history of a famine.
20. What is the role of population growth in world hunger?
21. What is the role of poverty in world hunger?
22. What are the best policies to reduce population growth?
23. What is the impact on food production of a nuclear war?
24. What are the criteria used to classify a country as "developed" or "developing"?
25. Describe the functions of one of the international agencies that provides agricultural aid, such as the World Bank, the Food and Agricultural Organization of the United Nations, or the U.S. Agency for International Development in the U.S. Department of State.

Cartoon Interpretation

Cartoon by Gene Bassett, Scripps-Howard Newspapers.

Ask students to analyze the cartoon above as an individual or small group activity. They should determine the message of the cartoon, and whether or not they agree with it. Ask them to explain their answers.

Creative Writing

Ask students to write an essay, short story, or skit about the world food situation 150 years from now. Will it be the same, better or worse? Consider in your response population growth, application of modern farming techniques, possible or likely scientific breakthroughs, the role of computers and other information systems, possible warfare, new forms of national or international governments and other factors you think will be important.

Debate Topics

Resolved: The United States should double the amount of money it contributes to agricultural development in less developed countries.

Resolved: Agricultural aid to poor,

(continued on page 4)

TEACHER RESOURCES

Analyzing Growth Policies of Developing Countries: A Resource Guide by Robert J. Highsmith, Lyman H. Heine and Phyllis Bailey. Joint Council on Economic Education, 2 Park Ave., New York, N.Y. 10016. 40 pp. with 20 handouts. $4.50; 40 percent discount on orders of 10 or more. (Orders must be prepaid with a $2.00 handling fee included.)

A good summary of economic development and foreign aid with six instructional activities.

Development Education Programs of U.S. Nonprofit Organizations. Technical Assistance Information Clearing House, American Council of Voluntary Agencies for Foreign Service, 200 Park Ave. So., New York, N.Y. 10003. 1983. 168 pp. $8.50 (plus $3.00 postage and handling fee).

A directory of 108 U.S. nonprofit organizations with development education programs, as well as an extensive index and bibliography on development education.

"Education for Action 7," *Hunger Notes,* Vol. 9, Nos. 1-2, June-July 1983. World Hunger Education Service, 1317 G St. N.W., Washington, D.C. 20005. 19 pp. $2.50. "Education for Action" is an annual issue of *Hunger Notes.* Back issues of the 1979-1982 editions are available for $1.00 each.

An annotated bibliography of the best publications on hunger issued during the previous year.

Food and Agriculture Organization of the United Nations packet for educators and students. FAO, Liaison Office for North America, 1001 22nd St. N.W., Washington, D.C. 20437. Free.

The FAO has a variety of publications of their own and of other organizations that they will send free of charge upon request. The packet includes informational booklets, classroom activities, resource lists, and brochures describing other organizations' publications.

"Food for All: Teaching Against Hunger," *Intercom* #102, September 1982. Global Perspectives in Education, Inc., 218 E. 18th St., New York, N.Y. 10003. 40 pp. $4.00.

Six lessons on hunger and development.

Food for Thought: A Population Simulation Kit. Population Reference Bureau, 2213 M St. N.W., Washington, D.C. 20037 $4.00 (plus $1.00 shipping and handling fee).

A kit with instructions for five simulations, background information, a set of charts on world and U.S. population and development trends, and the World Population Data Sheet.

Teaching About Food and Hunger by George G. Otero and Gary R. Smith. Center for Teaching International Relations, University of Denver, Denver, Col. 80208. 1978. 128 pp. $12.95 (plus $2.00 shipping and handling fee for one book, $.25 each additional book).

An activity book with 33 food and hunger activities for the classroom.

World Hunger: Learning to Face the Challenge. Impact on Hunger, Schools Project, 145 E. 49th St., New York, N.Y. 10017. 1983. 147 pp. $6.00 donation requested to cover costs.

A hunger education curriculum with teaching strategies for elementary and secondary grades which emphasizes organizing student groups to overcome world hunger.

(continued from page 3)

rapidly growing countries should be given without attaching conditions, such as a requirement that family planning programs be established or expanded.

Resolved: Food exporting countries like the U.S. should use food as a political tool; for example, to punish military aggression by the Soviet Union by withholding grain shipments or to establish an air force base in a poor country in exchange for food aid.

Resolved: It should be prohibited by law in the U.S. to convert agricultural lands to other purposes such as shopping centers and housing.

Resolved: Governments of wealthy countries should buy surplus grain and, by selling it to the USSR, China and others, finance the distribution of food to poor, developing countries.

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